

PILOT STUDY DESIGN

ADAMMISTRATIVE RECOAD

# EFFECT OF INDIRECT PREPARATION ON LA STRUCTURE COUNT IN AIR SAMPLES FROM LIBBY, MT

October 5, 2005

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#### 1.0 INTRODUCTION

At the Libby, Montana, Superfund site, most samples of air analyzed for Libby amphibole (LA) by transmission electron microscopy (TEM) are evaluated using a direct preparation method. However, some air samples contain sufficient levels of dust and other debris that an indirect preparation is needed to reduce the total loading on the filter for TEM examination. One potential limitation to an indirect preparation is that suspending the sample in water may cause some asbestos structures to disaggregate into smaller structures, thereby influencing the total number and types of asbestos structures observed. The purpose of this pilot study is to investigate whether indirect preparation does or does not result in a significant change in the number of LA structures counted under TEM.

#### 2.0 PILOT STUDY DESIGN

Sample Selection

The pilot study will be performed on a set of 35 air samples from Libby. These samples were selected from the set of all air samples already collected at the site and which have already been analyzed by TEM-AHERA using a direct preparation method. Samples analyzed originally by TEM-AHERA were selected because any disaggregation of complex structures that may be caused by the indirect preparation is more likely to be observable using AHERA counting rules than ISO 10312 counting rules. Because the purpose of this pilot study is to compare air concentrations between the two preparation methods, the selected air samples were restricted to air samples in which LA has been detected (as determined based on the direct preparation results). Because the uncertainty in air concentration is directly related to the total number of structures observed (i.e., as N increases, the relative uncertainty decreases), samples with more than 10 LA structures observed in 10 or fewer grid openings were selected preferentially. Because the indirect preparation requires ½ of the original filter (see below), only samples that have ½ or more of the original filter available for re-analysis were considered. The amount of filter remaining was estimated from the database by assuming that 1/4 of the filter was used for each type of analysis performed. For example, for a sample that had been analyzed by PCM and by TEM-AHERA, it was assumed that ½ of the filter would remain.

A total of 77 samples were identified which met the selection criteria above. These are listed in Table 1. Of these 77 samples, 35 samples were selected for re-analysis using indirect preparation. These 35 were selected at random, seeking to include samples from a variety of different locations around the site. Table 2 identifies the 35 air samples that were selected. If for any reason one or more of these samples can not be located or is otherwise considered unsuitable for use, any other sample from Table 1 may be substituted.

#### Sample Preparation

For each sample identified for indirect preparation, the original sample filter will be obtained from archive storage. If more than ½ of the original sample filter is available, ½ of the primary

filter will be used in the indirect preparation, and the remaining fraction of original filter will be saved for future reference. If only ½ of the original filter is available, all of the filter will be used in the preparation. The portion of the primary filter will be suspended in about 50 mL of filtered deionized (FDI) water in a graduated cylinder. In order to ensure that any structures that may have come off the filter during transport of storage are recovered, the inside of the cassette (filter removed) will then be rinsed with about 25-50 additional mL of FDI water, which will be added to the graduated cylinder. The entire volume of water (75-100 mL) will be applied to the secondary filter, which will be equal in diameter to the primary filter (typically 25 mm²). This procedure will result in an F-factor of 0.5.

#### Counting and Stopping Rules

All indirect preparations will be prepared for TEM examination as usual. Samples will be counted using the same AHERA counting rules as were used during the original analysis. That is, all LA structures that are at least 0.5 um long and have an aspect ratio of 5:1 or greater will be recorded. The number of grid openings analyzed in the indirect analysis will be twice the number analyzed in the original (direct) analysis (see Table 2).

### Data Recording

Data will be recorded in the most recent version of the TEM spreadsheet for analysis of air and dust samples. The sample comment field on the TEM spreadsheet should identify that the sample was evaluated as part of the indirect preparation pilot study (e.g., "Indirect Pilot Study").

#### 3.0 DATA EVALUATION

The LA air concentration from the indirect preparation will be compared to the LA air concentration from the direct preparation for the same sample. The comparison will be based on an evaluation of the ratio of the concentrations (indirect vs direct), as well as the method for comparison of two Poisson rates described by Nelson (1982). In addition, the frequency of occurrence of each type of structure classification (fiber, bundle, cluster, matrix) will be compared between the two types of preparation methods for the same sample. These results are expected to allow a determination as to the effect of indirect preparation on LA asbestos particles.

While EPA prefers to always retain a fraction of the original filter for re-analysis if needed, the goals of this study were considered to be sufficiently important that sacrificing the remaining filter for a selected subset of all samples was considered acceptable.

#### TABLE I LIST OF CANDIDATE SAMPLES

| (autex   | CO Adepte<br>Pederated | AP (MA Acadysis<br>Performed                     | PORTUGUES<br>Portugues | Paranct File<br>Remaining (s) | water for<br>plan to dy | Projectly Declaration                         | (rdne)<br>Outdoor | Polacyll<br>Saturally  | hdist D                       | <b>Weds</b>      | Analysis Martinal    | Prop No. Com     | Analysis (Late         | 60659<br>(1998)  | 4D Counted                                       | (FAPMI)    | FJetto           | Ag Velocin (1)  | Araku<br>Bersawey<br>(2000)   | US Kyrma                   | Lets Add Museum          | 0 فيستد ضا   | Tetal HCA<br>State                               | (ALECTIC<br>(place)                     | 1.6.00 Clare<br>(9/02)  |
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|  |                        | X  |                        | 0.75                          | -                       | ದಾಳ. ಶಿವರಿ                                    | 0207              | Column 1   | 16.1120                       | *                | LEN THORN            |                  | Themes.                | 690              | 1  | 蚆          |                  | MA              | 0,0000107   |                            |                          | 770E0612-6082  | 14   | 745.15254E                              |   |
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| 7  | _                      |  | <del>- 2 -</del>       | 0.5                           |                         | 1511 California<br>1511 California            | t special         | Personal   | 94.50Z                        | <u>*</u>         | TEM-MENA             |                  | 7-40y03<br>74-40y03    | 0.013            | 10   | 翠          | 1                | 131             | 667553 BM   | مريشين<br>مراخين           | Program                  | 170074400  | 2  |   | CHEVEZ  |
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| 11   |                        |  | <del></del> \$         | 9.5                           | -                       | Paperty Chin<br>ICC Barro                     | -                 | Person   | FLORES                        |                  | PENANCEA<br>PENANCEA | CARLET           | E-Squitt               | 6,0120           | 2  | 型          | <del>!</del>     | 611<br>611      | O CONTROLLEY  | Heide Las<br>Heide Las     | 779-C0040<br>40-2 (100   | 770-475-U-0780<br>1848   | 3  | 197003423                               | CONTRACTOR OF THE PARTY OF THE |
| 13   |                        | Ŷ  | Ŷ                      | 0.5                           | ++-                     | CERA  | Odding.           | ******   | (Barris                       |                  | Wasak Ra             | taréc1           | Manager                | QCIN             | -  | 25         | -                | iai             | 0.606513.073  | ***                        | 60,000                   | 1815   | <del>                                     </del> |   | and the last  |
| 14   |                        | X  | X                      | 0.5                           | 1                       | ICC Figure                                    |                   | Pateria  | 18-1420                       | Ar               | TEMAKIRA             | DEPART           | 74-3440                | 0.0120           | - N  | 121        | 1                | 0               | 0.00013-001   | ربي شنگ                    | #Project (C)             | graphones-been   | -  | 2000                                    | 01477661  |
| 15   |                        | X  | X                      | 4.5                           | 1                       | IDC Flyery                                    |                   | 1  | (R-MITT_                      | . 84             | TEMANERA             | DIRECT.          | 24-ME                  | 52               | •  | 뾰          | 1                | 110             | <b>68</b> 1570704   |                            | 2792001001               | 7600103-0605   | 15   |   | 0,235 H115  |
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| 17   |                        | <u> </u>   | <u>X</u>               | 0.5                           | <u></u>                 | piece (pres) presp                            | (1000             | Pertural   | (A-347H                       | A                | TEMAKERA             | DESCT            | 17-12:40               | 9 <i>8</i> 121   |  | ***        | 1                | 19              | 0.021213(2)   | Plant Terri                | 000438                   | descriptions;  | . 31   | 274 42001                               |   |
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| 22   |                        | X  | X                      | 0.5                           | -                       | K.wR±   |                   | 200000   | 47-010M                       | Ar               | TEM-AHERA            | CPEC             | C5-3::041              | Quinza           | 5  | 755        | 1                | ব্যঃ            | 400920  | Western                    | CHRESCO                  | 00700796\$-0003  | Z  | 62/11/70                                |   |
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| 74   |                        | <del>                                     </del> | <u>x</u>               | 0.5                           | -                       | Part Creek Bard                               |                   | Personal   | R-7153                        | - At             | HER-WERN             | OFFICE           | 28-Jan-91<br>15-Jan-93 | una<br>una       | - 6  | 25         | +                |                 | FREEZELZN:  |                            | 27000000                 | 7/000PS)-40M   | 1 12 ···   | 100                                     | 8.8717150   |
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| 36   |                        | X  |                        | 9.5                           |                         | Party Counts Red                              | (hathar           | Petroni  | (A-KI)                        | *                | TEN-ANERA            | C#95C7           | Directed in            | ra-s             |  | Ħ          |                  | <b>613</b>      | 0000423877  |                            | TRADE(I                  | . IFEE:215-0-5   | 75   | 25 MITSE                                |   |
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| 46   |                        | <del>  -</del> ₹                                 | - <del></del>          |                               | · •                     | Rathy Count Pol                               | 900               | Statement  | (Back)                        |                  | CH-MCRA              | CRESCI           | 66-bo-61               | 0.0120           | <del></del>                                      | - ES       | <del>'</del>     | 974             | 0.00(D6D)   | Western                    | 8017805                  | 000745-000   | - A  |   | 4040720   |
| 41   |                        | x  | x                      | 95                            | <u> </u>                | Raty Court Rd                                 | 0437              | Percent  | IR-MADE                       | 70               | TEM-MERA             | oneci            | 54eG                   | 1012             | -  | 225        | i                |                 | CONTRACTO   |                            | 7 (40,000,000)           | 774375307-4000   | 29   |   | <b>6.72136576</b> ≠   |
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| 43-  |                        | <del></del>                                      | Ŷ                      | 0.5                           |                         | Rating Couph Rey<br>Retry Chath Rd            | Octor             | Person   | 18-1003                       | 1 A3             | TEMANERA             | DRECS            | TAGE<br>Deskt          | 0.0123           |  | 25         | 1                | - W             | AND DESCRIPTION OF THE PERSON | Name (a)                   | 190300137                | 77020037-4002  |  |   | 0.000   |
| 47   |                        | - <del>- x</del> -                               | - <del>x</del>         | 0.5                           |                         | Resputato Pal                                 | -                 | Personal   | IR-MIM                        | ₩.               | TEM-WERA             | DEMOCT           | G-Market               | L#2              | -  | 25         | 1                | -               | 4,004747200   | فاطعت                      | 792049                   | POINT PARK   | 73   |   | 0.160007788   |
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| 4  | - "                    | X  | X                      | 0.5                           |                         | Racy Create Fol                               | (Access)          | Personal   | A.152                         | 4                | TEM-ANDRA            | 396¢1            | H-NoE                  | 492              | •  | 224        | 1                | 25)             | COURSE!   | Non-Lab                    | 19920210                 | 27800210-0004  | 21   | 142 Plate27                             |   |
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| - <del>31</del>                                  |                        | <del>  X</del>                                   | - X                    | 0.5                           | <del> </del> -          | Rathy Greek Rd<br>Rathy Count, Ref            | Outro<br>Outro    | Porces   | 新たれ(数)                        | - 70             | (CR-MON              | ONEC             | 日本の位                   | 0,000            | <del>- "-</del>                                  | 365        | 1                | 20              | E40140005   |                            | Printers                 | Substitution and   | 70   |   | PHOMISH   |
| 53   |                        | Ŷ  | ×                      | 9.5                           |                         | Racry Gesch Ra                                | 0000              | Penoral  | M-M20                         | ~                | TEMANERA             | OFFICE           | 17-40-62               | 0.0120           |  | - ===      | <del>- i</del>   | 777             | ORNERO .  | -                          | 790001                   | 27900013-0000  |  | H1300021                                | 6/39CH 10)  |
| 54   |                        | X  | ×                      | 9.5                           | 1                       | Rainy Creek Rd                                | 000               | Portre   | 78-W578                       | - 14             | TEMANERA             | DIFFECT          | 13.Aug-CI              | 96129            | 90   | 326        | - 1              | 342             | क्षेत्रकारी सम्बद्धा  |                            | 170,000                  | Springer, 49-0003  | 19   | 91250ff                                 |   |
| 35   |                        | X  | x                      | 9.5                           |                         | Company (S)                                   | -                 | Posterial  | 1R-HÚZO                       | A.               | TEMANERA             | OWNECT           | ****                   | 0.0126           | 10   | #5         | 1                | 219             | 11000   | م)خنط                      | 77000000                 | 7702400  | - "  | 131 (343)                               |   |
| 56<br>57   |                        | X  | _ X                    | 0.5                           |                         | Pairy Creen Ro                                | O come            | Personal   | 18-14 <b>09</b>               | *                | TEMMERA<br>TEMMERA   | MACT             | MANAGE PARTY           | 8 <i>0</i> (3)   | - *-   | 225        | 1                | 413<br>224      | 0.0F725(9)  | Printe<br>makes            | 2/000000                 | 3/2000 H-000   | tá IZ  | 131 70345                               | A (THE  |
| 57<br>58   | _                      | X  | X                      | 0.5                           | $\vdash$                | Rates Create Rate                             | Octor<br>Octor    | Posterel   | 1R-16204                      | **               | THEATRA              | DRECT            | 13-446-07              | 0.0129           | <del>  "</del>                                   | 35         | <del>-;-</del>   | - 128<br>194    | CONTRACT USE  |                            | 27020114                 | //www.p-are  |  |   | 0.000077976   |
| 59   |                        | <del>  </del>                                    | <del></del>            | 1 - 13 -                      | $\vdash$                | Aginy Count Rev                               | Odd               | Personal   | 1R-HARRIS .                   |                  | TEM HERA             | DIRECT           |                        | 102              | <del>                                     </del> |            | <u> </u>         | 225             | 0.00007000  |                            | 27500025                 | \$4000559-0000   |  | 11 LEPHOCE                              |   |
| - 60   |                        | L x  | x_                     | _ 0.5                         | 1                       | Rang Creata Pol                               |                   | Penand   | 18-475                        | Ā                | THE MERA             | SERECT.          | Die B                  | 80128            | 10   | 325        | <del>-</del>     | 317             | GARMA MARIA   |                            | 777000                   | 7492240  | 11   |   | 1 AMERICA   |
| 61   |                        | Х  | X                      | 0.5                           |                         | Parry Creek Ray                               | Outer             | Pomoral  | 共成型                           | -                | REMAKERA.            | DIRECT           | 71.00g-02              | 6,612            | -60  | 35         | _ 1              | Bri             | G.(Cambridge)   |                            | 370000229                | 310000325-0000   |  |   | (TERMS  |
| 62   |                        | X  | _ X                    | 9.9                           |                         | Ray Onto Rd                                   | ì                 | Potond   | (R-2180)                      | -                | TEMPANERA            | (MASC)           | 31-340                 | 6,0125           | - 6  | 365        | 1                | -               | 0.0(1574047   | local La                   | 27400015                 | 200015-000   | 11   |   | 0.155526.74   |
| - 63<br>- 64                                     |                        | X X  | - X                    | 0.5                           | ļ — —                   | Recy Cresh Fol                                |                   | Personal   | (F-MED)                       | - *              | TEMPERA              | DSMECT<br>DREACT | NAME OF                | 9.0128<br>9.0128 |  | 200        |                  | - <del>0</del>  | 0.00017001<br>0.00017001  | م اطولا<br>م اطولا         | 2717300237<br>2712301165 | Samuel et ann  | - 0  |   | Leaning III   |
| 45   |                        | +  | X                      | 0.5                           | $\vdash$                | Rany Great Rd<br>Many Creat Art               | Octor             | Personal   | M-MEDI                        | ~                | (SHAEN               | DRECT            |                        | Mara             | -  | 85<br>85   | 1                | 344             | CONTRACT  | #68LB                      | 27000001                 | 27000001F4017  |  |   | d.milita  |
| -66  |                        | <del>- x</del>                                   | <del></del>            | - 23                          | 1                       | Raday Caredo Pid                              | 9                 | 1  | rik-Hitzs                     |                  | KM-MEAN              | DRECT            | 23-Aug-02              | 0.0120           |  | 375        | _ 1_             | <u> </u>        | COMPOSETS.  | 1                          | 70/00/202                | 71020012-00E1  | . 17   | C.CC230                                 |   |
| 67   |                        | X  | X                      | 0.5                           |                         | Recty Corpus Red                              | ٠,                | Parporal   | (A-MIDS                       | Je               | TEM-MERA             | 9960             | 13-449-02              | 0.0120           | •  | 些          | 71               | -               | 9 (1785)  | Vantus:                    | 1,000045                 | Samuel in-com.   | D  |   | a minima di p   |
| - 68   |                        | X  |                        | 0.75                          |                         | Rose Case à Rol                               | O SHIP            | Parent   | III-HAM                       | A                | (Ex-MEN              |                  | DAUP#                  | 04729            | 19   | 25         | 1.               | ¢II             | 400000  | حاطيقا                     | 27000191                 | 7000(1400)   |  |   | 1007103   |
| <u></u>  |                        | - х  | <u> </u>               | 0.5                           |                         | Rosey Crops, Rd                               | Outres.           | Permed   | P. MED                        | 40               | TEM-MENA             | OFFICE<br>OFFICE | 15-40-0                | 0.0125           |  | 28         | 1                | 61              | 00400340  |                            | 7/030000<br>570000000    | Treatments-com   |  |   | 0.5301 (742)<br>0.074(203)  |
| - 70<br>71                                       |                        | 1 2  | X                      | 0.5                           | $\vdash$                | Resignation Ass                               | 0.00              | Portugal<br>Portugal   | 4-2 kg                        | **               | TEM-MERA             | OPPECT           | H-App-02               | 0,013            | <del>                                     </del> | 385<br>185 | <del></del> -    | - (15           | 0.02-2200   | فاطعف                      | 7/0400508                | Sucheritization  | 17   |   | 12510201  |
| ┝╬┪  |                        | - X  | <u> </u>               | 0.5                           |                         | Aury Cod. 10 - 3 Frontage<br>Suppregiftent    | O.De              | Powerd   | #455H                         | ~                | IEN-MEN              | OFFICE           | 25.4m-01               | 0.0120           | <del>  7</del>                                   | **         | ÷                | - TOO           | o grotest tyr   | ***                        | MARKET                   | 19541  | -  |   | 0.274Feb2   |
| 77   |                        | Î  | x                      | 0.5                           |                         | Janaan Pari                                   | 0                 | Personal   | <b>内心图图</b>                   | 20               | TEM-MERA             | CERECT           | 28-Am-01               | 1912             | <del>-</del>                                     | =          | <del></del>      | <del></del>     | 0.047272864   | Simple:                    | ATIMA<br>ATIMA           | 1980   | 11   | 131 762945                              |   |
| 74   |                        | X  | X                      | 0.5                           |                         | Samuring Plant                                | OCE-              | P  | IR-06689                      | *                | TEXAMENA.            | OREC             | 25-Amôs                | 0.0109           | 7_   | . 385_     | . (              | 694             | 9,0000000000  |                            | MAKE                     |  | ч  |   | 0 00 (2000)   |
| -73  |                        | X  | Т.                     | 4.5                           | 1                       | Stateurs Plans                                | 9                 | 2000   | 194504                        | Ar.              | TEMAHENA             | CMSCT            |                        | 8.6126           |  | 薦          |                  | rtzi            | 0.000117847   |                            | 0.000                    | 15412  |  |   | 9,040(27)   |
| 76   |                        | <u>*</u>   | <u>*</u>               | 9.5                           |                         | Coloring Plant Plymby                         | Outros            | Powed  | 1849741                       |                  | TEM AND THE          | DRECT            |                        | 00125            |  |            | 1                | -01             | d Married   | 661                        | 143-1711                 | egentis-nitat  |  |   | 4.14E731FE  |
| _77  |                        | X  | . X                    | 0.5                           | 1 1                     | Schools Park Report                           | Out to            | Power  | 18-14709                      | 4                | <b>克罗奇德</b> 斯        | DOECT            | 23-3444                | 0.0125           | *  | 345        | _ •_             | 255             | 1   | خاجنت                      | 77.00×144                | 2420 le-400  | 17   | 002223                                  | 10111111111111111111111111111111111111  |

Table 2
Selected Samples for Indirect Preparation

|          | SAMPLE INFOR            | MATION              |               | ANALYSIS INFORMATION |                |               |                    |                |               |                  |                                 |                                   |                                      | RESULTS                  |                        |  |  |
|----------|-------------------------|---------------------|---------------|----------------------|----------------|---------------|--------------------|----------------|---------------|------------------|---------------------------------|-----------------------------------|--------------------------------------|--------------------------|------------------------|--|--|
| Index ID | Property Description    | Media Description   | Volume<br>(L) | Lab                  | Lab Sample ID  | Analysis Date | Analysis<br>Method | Prep<br>Method | GO<br>Counted | GO Size<br>(mm²) | Primary<br>Filter Area<br>(mm²) | Analysis<br>Sensitivity<br>(s/cc) | Primary Filter<br>Loading<br>(s/mm²) | Total N LA<br>Structures | LA Air<br>Conc. (s/cc) |  |  |
| IR-31263 | 105 W. 2nd St           | Outdoor, Stationary | 1,376         | Mobile Lab           | 270500592-0001 | 6/23/2005     | AHERA              | Direct         | 5             | 0.013            | 385                             | 4.3E-03                           | 200                                  | 13                       | 5.6E-02                |  |  |
| 1R-31264 | 105 W. 2nd St           | Outdoor, Stationary | 1,474         | Mobile Lab           | 270500592-0002 | 6/23/2005     | AHERA              | Direct         | 5             | 0.013            | 385                             | 4.0E-03                           | 246                                  | 16                       | 6.4E-02                |  |  |
| 1R-29025 | ISII Gellatin Ave       | Indoor, Personal    | 61            | Mobile Lab           | 270500410-0001 | 5/24/2005     | AHERA              | Direct         | 10            | 0.013            | 385                             | 4.9E-02                           | 223                                  | 29                       | 1.4E+00                |  |  |
| 1R-29026 | 1511 Gallatin Ave       | Outdoor, Stationary | 131           | Mobile Lab           | 270500410-0002 | 5/24/2005     | AHERA              | Direct         | 10            | 0.013            | 385                             | 2.3E-02                           | 292                                  | 38                       | 8.6E-01                |  |  |
| 1R-14570 | 156 S. Central Rd       | Indoor, Personal    | 665           | Mobile Lab           | 270200220-0010 | 8/20/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 4.5E-03                           | 163                                  | 21                       | 9.4E-02                |  |  |
| 1R-14574 | 156 S. Central Rd       | Outdoor, Stationary | 423           | Mobile Lab           | 270200224-0001 | 8/21/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 7.1E-03                           | 178                                  | 23                       | 1.6E-01                |  |  |
| IR-14553 | 156 S. Central Rd       | Indoor, Personal    | 149           | Mobile Lab           | 270200212-0009 | 8/17/2002     | AHERA              | Direct         | 0.0129        | 10               | 385                             | 2.0E-02                           | 163                                  | 21                       | 4.2E-01                |  |  |
| 1R-28513 | 4000 Pipe Creek Rd      | Outdoor, Stationary | 1,290         | Mobile Lab           | 270500008-0003 | 1/14/2005     | AHERA              | Direct         | 5             | 0.013            | 385                             | 4.6E-03                           | 185                                  | 12                       | 5.5E-02                |  |  |
| FL-00539 | Flyway Site             | Outdoor, Personal   | 576           | Mobile Lab           | 270400643-0006 | 8/30/2004     | AHERA              | Direct         | 10            | 0.013            | 385                             | 5.1E-03                           | 115                                  | 15                       | 7.7E-02                |  |  |
| 1R-08836 | KDC Bluffs              | Outdoor, Stationary | 661           | Mobile Lab           | ML01920-19494  | 9/6/2001      | AHERA              | Direct         | 10            | 0.0129           | 385                             | 4.5E-03                           | 147                                  | 19                       | 8.6E-02                |  |  |
| IR-08838 | KDC Bluffs              | Outdoor, Personal   | 615           | Mobile Lab           | ML01920-19496  | 9/6/2001      | AHERA              | Direct         | 10            | 0.0129           | 385                             | 4.9E-03                           | 155                                  | 20                       | 9.7E-02                |  |  |
| IR-14215 | KDC Flyway              | Outdoor, Personal   | 366_          | Mobile Lab           | 270200165-0001 | 7/24/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 8.2E-03                           | 140                                  | 18                       | 1.5E-01                |  |  |
| IR-14217 | KDC Flyway              | Outdoor, Stationary | 190           | Mobile Lab           | 270200165-0003 | 7/24/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 1.6E-02                           | 116                                  | 15                       | 2.4E-01                |  |  |
| IR-23369 | Lincoln County Landfill | Outdoor, Personal   | 294           | Mobile Lab           | 270301071-0003 | 10/8/2003     | AHERA              | Direct         | 5             | 0.013            | 385                             | 2.0E-02                           | 785                                  | 51                       | 1.0E+00                |  |  |
| IR-23372 | Lincoln County Landfill | Outdoor, Personal   | 60            | Mobile Lab           | 270301071-0006 | 10/8/2003     | AHERA              | Direct         | 10            | 0.013            | 385                             | 4.9E-02                           | 169                                  | 22                       | 1.1E+00                |  |  |
| IR-24701 | Lincoln County Landfill | Outdoor, Stationary | 150           | Westmont             | 040404536-0002 | 3/17/2004     | AHERA              | Direct         | 10            | 0.0121           | 385                             | 2.1E-02                           | 256                                  | 31                       | 6.6E-01                |  |  |
| 1R-04984 | Mine Rd                 | Outdoor, Stationary | 4,515         | Westmont             | 040107965-0003 | 6/5/2001      | AHERA              | Direct         | 2             | 0.0129           | 385                             | 3.3E-03                           | 853                                  | 22                       | 7.3E-02                |  |  |
| IR-04985 | Mine Rd                 | Outdoor, Stationary | 4,950         | Westmont             | 040107965-0004 | 6/5/2001      | AHERA              | Direct         | 2             | 0.0129           | 385                             | 3.0E-03                           | 659                                  | 17                       | 5.1E-02                |  |  |
| IR-21585 | Rainy Creek Bank        | Indoor, Personal    | 230           | Mobile Lab           | 270300759-0014 | 7/18/2003     | AHERA              | Direct         | 10            | 0.0125           | 385                             | 1.3E-02                           | 192                                  | 24                       | 3.2E-01                |  |  |
| 1R-04986 | Rainy Creek Rd          | Outdoor, Stationary | 4,807         | Westmont             | 040107965-0005 | 6/6/2001      | AHERA              | Direct         | 2             | 0.0129           | 385                             | 3.1E-03                           | 1,202                                | 31                       | 9.6E-02                |  |  |
| 1R-04987 | Rainy Creek Rd          | Outdoor, Stationary | 4,674         | Westmont             | 040107965-0006 | 6/6/2001      | AHERA              | Direct         | 4             | 0.0129           | 385                             | 1.6E-03                           | 543                                  | 28                       | 4.5E-02                |  |  |
| 1R-14413 | Rainy Creek Rd          | Outdoor, Stationary | 304           | Mobile Lab           | 270200225-0005 | 8/21/2002     | AHERA              | Direct         | 10 -          | 0.0129           | 385                             | 9.8E-03                           | 171                                  | 22.                      | 2.2E-01                |  |  |
| IR-14416 | Rainy Creek Rd          | Outdoor, Stationary | 623           | Mobile Lab           | 270200218-0004 | 8/20/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 4.8E-03                           | 302                                  | 39                       | 1.9E-01                |  |  |
| IR-14508 | Rainy Creek Rd          | Outdoor, Stationary | 342           | Mobile Lab           | 270200198-0009 | 8/13/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 8.7E-03                           | 147                                  | 19                       | 1.76-01                |  |  |
| IR-14519 | Rainy Creek Rd          | Outdoor, Personal   | 723           | Mobile Lab           | 270200208-0001 | 8/15/2002     | AHERA              | Direct         | 9             | 0.0129           | 385                             | 4.6E-03                           | 422                                  | 49                       | 2.2E-01                |  |  |
| 1R-14725 | Rainy Creek Rd          | Outdoor, Stationary | 317           | Mobile Lab           | 270200232-0003 | 8/23/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 9,4E-03                           | 116                                  | 15                       | 1.4E-01                |  |  |
| 1R-21599 | Rainy Creek Rd          | Outdoor, Stationary | 225           | Mobile Lab           | 270300763-0013 | 7/18/2003     | AHERA              | Direct         | 10            | 0.0125           | 385                             | 1.4E-02                           | 192                                  | 24                       | 3.3E-01                |  |  |
| IR-21793 | Rainy Creek Rd          | Outdoor, Personal   | 270           | Mobile Lab           | 270300802-0003 | 7/26/2003     | AHERA              | Direct         | 10            | 0.0125           | 385                             | 1.1E-02                           | 264                                  | 33                       | 3.8E-01                |  |  |
| 1R-22376 | Rainy Creek Rd          | Outdoor, Stationary | 62            | Mobile Lab           | 270300916-0003 | 8/26/2003     | AHERA              | Direct         | 5             | 0.0125           | 385                             | 9.9E-02                           | 864                                  | 54                       | 5.4E+00                |  |  |
| 1R-23355 | Rainy Creek Rd          | Outdoor, Personal   | 60            | Mobile Lab           | 270301071-0001 | 10/8/2003     | AHERA              | Direct         | 4             | 0.013            | 385                             | 1.2E-01                           | 1,038                                | 54                       | 6.7E+00                |  |  |
| IR-05349 | Screening Plant         | Outdoor, Stationary | 1,728         | Mobile Lab           | ML01407-15182  | 6/20/2001     | AHERA              | Direct         | 4             | 0.0129           | 385                             | 4.3E-03                           | 291                                  | 15                       | 6.5E-02                |  |  |
| IR-05584 | Screening Plant         | Outdoor, Personal   | 838           | Mobile Lab           | ML01457-15561  | 6/28/2001     | AHERA              | Direct         | . 7           | 0.0129           | 385                             | 5.1E-03                           | 598                                  | 54                       | 2.7E-01                |  |  |
| 1R-05585 | Screening Plant         | Outdoor, Stationary | 63            | Mobile Lab           | ML01457-15562  | 6/28/2001     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 1.7E-02                           | 132                                  | 17                       | 8.1E-01                |  |  |
| IR-07741 | Screening Plant Flyway  | Outdoor, Personal   | 839           | EMSL                 | ML01753-17837  | 8/17/2001     | AHERA              | Direct         | 8             | 0.0129           | 385                             | 4.4E-03                           | 320                                  | 33                       | 1.5E-01                |  |  |
| IR-14208 | Screening Plant Flyway  | Outdoor, Stationary | 316           | Mobile Lab           | 270200164-0001 | 7/23/2002     | AHERA              | Direct         | 10            | 0.0129           | 385                             | 9.4E-03                           | 93                                   | 12                       | 1.1E-01                |  |  |